DOCUMENT RESUME

ED 201 525 SE 034 930

AUTHOR Jones, Dan R.
TITLE A Comparison of Pupil Control Ideology of Science and Non-Science Secondary Student Teachers.
PUB DATE Apr 81
NOTE 7p.; Paper presented at the Annual Meeting of the National Association for Research in Science Teaching (54th, Grossinger's in the Catskills, Ellenville, NY, April 5-8, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Classroom Techniques; Higher Education; Preservice Teacher Education; Science Education; Science Instruction; Science Teachers; Secondary Education; Secondary School Science; Secondary School Teachers; Sex Differences; *Student Characteristics; *Student Teachers; *Teaching Experience
IDENTIFIERS *Science Education Research

ABSTRACT

This paper examines data on pupil control ideology (PCI) from two separate research studies involving secondary student teachers. A comparison was made of the results of the studies contrasting two student teaching populations: (1) eight weeks science (N=19) and (2) sixteen weeks non-science (N=22). The pupil control ideology of the secondary student teachers was measured before and after their field experience by the "Pupil Control Ideology Form." Significant differences were not found between groups on the pre-PCI means or between pre-PCI and post-PCI means of either group, although the means of both increased from pre- to post- measures (more custodial). The post-PCI of non-science females was significantly higher (more custodial) then the post-PCI of science females. These results indicate that PCI may be influenced more by length of student teaching than by the subject area taught. (Author/DS)

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A COMPARISON OF PUPIL CONTROL IDEOLOGY OF SCIENCE AND NON-SCIENCE SECONDARY STUDENT TEACHERS

Dan R. Jones

Department of Curriculum, Instruction & Media
College of Education
Southern Illinois University at Carbondale
Carbondale, Illinois 62901

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Paper presented at the 54th Annual Meeting
of the National Association for Research in Science Teaching,
Grossinger's Conference Center, New York
April 7, 1981

SE 034 930

Dan R. Jones

CONTRIBUTED PAPER

1981 Annunal Meeting of NARST

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Purpose and Rationale

This paper examines data on pupil control ideology (PCI) from two separate research studies involving secondary student teachers. A comparison is made of the results of the studies contrasting two student teaching populations: 8-weeks science (SCI) and 16-weeks non-science (N-SCI). Hence, each of the two groups possessed one level of the variables "Length of Student Teaching" (8 or 16 weeks) and "Secondary Subject Taught" (science or other subjects found in secondary schools).

This paper specifically addresses three questions to the results of the two studies:

1. Do secondary science student teachers differ in PCI from student teachers in other secondary subject areas?
2. Does a shorter field experience for secondary science student teachers yield a different PCI than that observed in a longer experience for non-science student teachers?
3. Does a difference in PCI exist within or between the groups on the variable of sex?

Prior research by Hoy (1967, 1969) found that the PCI of secondary teachers changed during student teaching of 8-weeks and during the first year of in-service experience. His data indicated that, at least during this pre- and very early in-service portion of one's teaching experiences, there is a significant change in PCI. Jones and Harty (1980) found a significant correlation between the amount of time pre-service science teachers were engaged in instructional activity during student teaching and their PCI which indicated that increased instructional time shifted PCI in the same direction observed by Hoy. Jones and Harty (1978) also found a significant correlation between years of teaching experience of in-service secondary science teachers and shifts in PCI in this direction. Such studies would suggest that a difference in PCI might be observed in student teaching experiences of different lengths. Also, the additional consideration of secondary subject taught could be considered with the two populations available from the studies to address questions concerning whether science student teachers with shorter field experiences differ from a more heterogenous population of student teachers (re: subjects of the secondary school curriculum represented) engaged in a longer field experience.

Procedure and Instrumentation

Two separate studies were completed in which the pupil control ideology of secondary student teachers was measured before and at the end of their field experience. The PCI of professional educators within schools has been conceptualized along a continuum ranging from the extremes of "custodialism" to "humanism" (Willower, et. al., 1967). These polar ideological

"ideal types" conceive of the custodial setting as an autocratic organization of school where rigid control of student behavior is the central concern, with a pessimistic, watchful mistrust characterizing a custodial viewpoint of pupil control; the humanistic setting has teachers desiring a democratic atmosphere with two-way communication that flows spontaneously between pupils and teachers, and has self-discipline being substituted for strict teacher control (Hoy, 1967). The extent to which a teacher is custodial or humanistic in their pupil control ideology is measured by the "Pupil Control Ideology Form" (Willower, et.al., 1967) in which a numerical score is produced by responses to 20 items on a Likert-type scale--the higher the score, the more custodial the individual's pupil control ideology (possible range of scores: 20-100).

Both groups in the studies were administered the instrument prior to beginning student teaching (Pre-PCI) and at the end of student teaching (Post-PCI). All Ss student taught in a public secondary junior or senior high school, but differed in subject area taught and length of their field experience. Selected demographic data for sex, age, college major, and subject student taught were also gathered.

The two groups (SCI, N=19; N-SCI, N=22) were each a population of student teachers available to the researcher for collecting PCI measures. No randomization was possible in selection of Ss or assignment to length of student teaching because of the small number of student teachers available (especially SCI Ss) and the requirements for field experience duration at the two institutions where the studies were completed.

The means of Pre-PCI for both groups were contrasted with a t-test for unmatched groups to determine equivalency of PCI prior to student teaching. T-test comparisons between Post-PCI means of the two groups and Pre-Post means contrast within groups were calculated to adress the three research questions.

Results

Table 1 presents the data obtained by PCI measures from the two groups of student teachers.

TABLE 1

PCI Data For SCI and N-SCI Student Teachers

	Pre-		Post-	
	SCI	N-SCI	SCI	N-SCI
$\bar{X}$	52.95	53.22	54.53	58.22
(σ^2)	(19.28)	(45.72)	(77.37)	(91.35)
PCI Scores				
20-40 (humanistic)	0	2	0	1
41-60 (mid-range)	19	17	15	13
61-80 (custodial)	0	3	4	8

The difference between Pre-PCI means between groups was not significant, thus indicating equivalent pupil control ideology for both groups prior to student teaching. The three intervals in Table 1 show a distribution across all categories for N-SCI prior to student teaching, while all scores for SCI were clustered in the mid-range. The lowest Pre-PCI scores were 38 for N-SCI Ss and 41 for SCI Ss; the highest were 63 for N-SCI Ss and 58 for SCI Ss.

The SCI Ss student taught in three subject areas: H.S. Biology (n=14), J.H. ISCS (n=4), and H.S. Physics (n=1). All SCI Ss taught science courses reflecting their college majors (i.e., Biological Sciences, General Science, and Physics respectively). The N-SCI Ss taught secondary school subjects in content areas matching their college major: Home Economics (n=4), Agriculture (n=3), Business (n=3), Industrial Arts (n=3), Social Studies (n=3), Math (n=1), Health (n=1), Spanish (n=1), English (n=1), Speech (n=1), and Physical Education (n=1). The mean and range of age were identical for both groups: 22.7 years and 21-28 years respectively. The SCI group had more males (11♂ vs. 8♀) while the N-SCI had more females (9♂ vs. 13♀).

T-tests for non-independent samples contrasting Pre- and Post-PCI means for each group found the +5.00 increase for N-SCI Ss to be significant ($p < .01$), but the increase in SCI Ss mean PCI (+1.58) was not significant. Hence, even though the PCI of both groups became more positive (more custodial) after student teaching, the magnitude of change observed for N-SCI was the only one statistically significant. The number of Ss shifting from the mid-range to custodial interval on the Post-PCI measure was nearly equal for both groups. The lowest and highest Post-PCI scores were 39 and 78 for N-SCI and 41 and 70 for SCI Ss.

A t-test for unmatched groups found the difference between Post-PCI means for the two groups to be non-significant. However, the difference between groups means increased from +0.27 on Pre-PCI to +3.69 on Post-PCI. Hence, the N-SCI group, with a longer student teaching experience, became "more custodial" to a greater degree than SCI student teachers after their field experience.

It is interesting to note that removal of subjects teaching junior high level courses in either group (4 for SCI, 1 for N-SCI) did not change the finding of no significant difference between group means on either the Pre-PCI or Post-PCI measures. Hence, the discussion in this paper considers "secondary" to include both J.H. and H.S. subjects.

Contrasts of means between males and females, both within and between groups, on the Pre-PCI and Post-PCI measures revealed only one significant difference: the Post-PCI of N-SCI females ($60.85, \sigma^2=101.36$) was significantly higher (more custodial) than the Post-PCI of SCI females ($50.13, \sigma^2=62.61$) with $p < .05$. These two subgroups were not statistically different on the Pre-PCI. Other interesting (but non-significant) differences on Post-PCI were: male SCI more custodial than female N-SCI; male SCI more custodial than male N-SCI; male SCI more than female SCI. When combining all male and all female scores from both groups, non-significant differences between means were observed on both the Pre-PCI (53.45 vs. 52.76) and Post-PCI (56.25 vs. 56.76).

Analysis

Caution must be exercised in drawing implications from this contrast of data from the two studies. The major limitations are the small, non-random populations and an imcomplete design lacking data for all levels of the two variables "Length" and "Subject". A factorial design including groups of 16-weeks SCI and 8-weeks N-SCI in addition to the present data would permit clearer interpretation and future studies should attempt to incorporate such a design. However, locating preservice science populations is becoming difficult with enrollment decline in science teacher training programs. To locate all four groups in such a design would require collaboration between institutions with varying lengths of student teaching. This would also address Hoy's (1969, 1977) concern about examining PCI data in populations from one institution (this paper is a attempt to begin such examinations).

Nevertheless, some implication are suggested by the comparison in this paper and are warrented if this contrast is considered exploratory, limited to the populations cited, and suggestive of future research efforts. The following implications are advanced in response to the three research questions.

Research Question 1:

Secondary science student teachers do not differ significantly from student teachers in other secondary subject areas either before or after student teaching in their pupil control ideology. The experience of student teaching for both SCI and N-SCI groups was to influence their ideology to shift toward a more custodial orientation. However, only the N-SCI Ss, involved in student teaching twice as long as SCI Ss, showed a significant increase from Pre- to Post-PCI. This result suggests that "Length" of student teaching does influence the degree of shift and supports an earlier finding that increased amounts of instructional activity time during student teaching produces a more custodial orientation (Jones & Harty, 1980).

Research Question 2:

The shorter student teaching experience for SCI Ss did not yield a significantly different pupil control ideology than that observed in N-SCI Ss. This occurred even though both groups shifted toward a more custodial orientation after student teaching. If length alone was acting to influence PCI, than the N-SCI group should have become statistically more custodial. In fact, they did have a greater degree of shift (+5.00 vs. +1.58 for SCI), but the difference in PCI between groups (+3.69) remained statistically equivalent. Hence, some other factor(s) besides length may have influenced this and permitted the SCI Ss to "keep pace" with the N-SCI shift even though they student taught only half as long. The small population sizes could be responsible (larger Ns could yield a significant difference for a between group value of +3.69 assuming similar results were obtained). But it is possible that the subject area taught has influence. Along this line of interpretation, although length of student teaching influences the degree of custodial orientation shift within groups, the subject area may act

between groups to enhance the shift for science student teachers so as to "compensate" for a shorter length. For some reason(s), teaching science promoted the adoption of a pupil control ideology as custodial (statistically) as that of non-science student teachers involved twice as long in the field experience. The difference between training programs at the two institutions could have been a factor. Or perhaps science teaching requires as much "custodialism" for the neophyte in a shorter span of time and/or necessitates adoption of the more custodial orientation sooner for science student teachers than in a longer field experience.

Research Question 3:

The significant difference in PCI on the variable of gender after student teaching was observed only between N-SCI females and SCI females. The N-SCI females became significantly more custodial after student teaching even though they were equivalent to SCI females when beginning the experience. It is not clear whether length and/or subject taught influenced the difference. Perhaps female science student teachers are less susceptible to adoption of a more custodial orientation because of the subject taught (other studies show females in 8-weeks student teaching assignments to become statistically more custodial, e.g., Hoy, 1967, 1969).

In conclusion, the comparison of these two groups suggests that more than just length of student teaching may be acting to influence the change in pupil control ideology often observed in secondary student teachers. Subject area taught may also act to change a neophyte's ideology and, in this comparison, may provide one possible explanation of why science student teachers become as custodial as non-science counterparts even though engaged in the field experience for only half as long.

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